REMARKS

This amendment is responsive to the Office Action dated January 30, 2008. Applicant has amended claims 1, 7-9, 15, 20, 21, 26, 29, 30 and 34-37 and cancelled claim 38. Claims 1-37 are pending.

Claim Rejection Under 35 U.S.C. § 101

In the Office Action, the Examiner rejected claim 29 under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Applicant has amended claims 29 and 30 in the manner suggested by the Examiner and submits that these claims are now directed to statutory subject matter. For example, Applicant has amended claim 29 to recite "[a] computer readable medium storing a computer program that comprises instructions to cause a processor to ..." This amendment coincides with one of the example formats listed by the Examiner as acceptable language formats. Accordingly, Applicant submits that these claims 29 and 30 comply with 35 U.S.C. 101 and requests withdrawal of the objection against these claims.

Claim Rejection Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 34-37 under 35 U.S.C. 102(b) as being anticipated by Deng (US 6,243,394). Applicant respectfully traverses the rejection to the extent such rejection may be considered applicable to the amended claims. Deng fails to disclose each and every feature of the claimed invention, as required by 35 U.S.C. 102(b), and provides no teaching that would have suggested the desirability of modification to include such features.

For example, Deng fails to teach or suggest a method comprising processing a packet with a first interface of a network device to access data within the packet, and associating the packet with metadata based on the data within the packet, as recited by Applicant's currently amended claim 34.

Also, Deng fails to teach or suggest the method of currently amended claim 34, wherein the metadata defines protocol-independent class of service (CoS) information, and wherein the protocol-independent CoS information provides a universal classification mechanism and is independent of any layer two protocols and protocols of layers on top of layer two used to forward packets within a network.

Moreover, Deng fails to teach or suggest the method further comprising subsequently processing the packet with a second interface of the network device in accordance with the protocol-independent CoS information, also as recited by Applicant's currently amended claim 34.

Instead, Deng describes a device that converts between different types of communication protocols, e.g., between from a physical layer ADSL protocol to an internal format of the device, such as the DMA protocol. Specifically, Deng describes an asymmetric digital subscriber line (ADSL) access device that controls communication through one or more ADSL channels.[1] According to Deng, the ADSL access device conforms to the ADSL standard, which is a physical layer standard providing for a simplex downstream channel at set maximum and minimum transfer rates.[2] The ADSL access device of Deng is intended to control data communications, in one aspect, between a wide area network (WAN), a layer 2 or data link layer protocol, and remote device through a plurality of the ADSL channels.[3]

To control the communications between the WAN and ADSL channels, the ADSL access device includes ADSL protocol converters, e.g., protocol converts 172, 182 and 192, and a WAN protocol converter, e.g., protocol converter 162.[4] The ADSL protocol converters convert the protocol of data packets received on the ADSL channel from the ADSL channel from the ADSL

[1] Claim 1; Abstract.
[2] Column 1, lines 23-33; column 4, lines 52-65.
[3] Column 3, lines 4-7.
[4] FIG. 5.

protocol to an internal format of the access device.[5] According to Deng, one example of an internal format is a direct memory access (DMA) bus format.[6] The ADSL protocol converters may also convert data packets transmitted to the ADSL channel from the internal protocol to the ADSL protocol.[7] Likewise, the WAN protocol converter converts the protocol of data packets received from the wide area network from WAN protocols, such as a frame relay or an ATM protocol, to the internal protocol of the access device, e.g., DMA bus protocol.[8] Also, the WAN protocol converter, similar to the ADSL protocol converters, converts the protocol of the data packets transmitted to the wide area network from the internal protocol to one of the WAN protocols.[9] In this manner, data communications may be converted between various protocols or processed to facilitate the control of data communications between the WAN network and ADSL channels.

Deng therefore describes conversion of a physical layer ADSL protocol to an internal format, such as that provided by the DMA protocol. The DMA protocol provides a protocol that enables peripheral devices, such as an ADSL modem, to issuing requests for storing and accessing a memory directly via a shared bus without involving a central processing unit (CPU), hence the name "direct memory access." Most of the DMA protocol involves dealing with the shared nature of the bus, such as handling simultaneous read and/or write requests. As a result, converting to the DMA protocol involves minimal conversion other than possibly converting the data into a format that can be transmitted across the shared bus or stored in the memory. It appears that Deng terms the converters as WAN or ADSL protocol converts to indicate the conversion of the ADSL data into WAN data, not to reflect the conversion of ADSL or WAN data into the DMA format. Deng recognizes this by stating, "In some instances, it may be desirable to eliminate one of the protocol conversions and to convert directly from ADSL protocol to WAN protocol."[10]

---

[5] Column 7, lines 51-57.
[6] Column 7, lines 51-57.
[7] Column 7, lines 51-57.
[8] Column 7, lines 57-63.
[9] Column 7, lines 57-63.
[10] Column 7, lines 63-65.

The Examiner, in rejecting Applicant's original claim 34, however cites to column 7, lines 52-57 as disclosing a first interface to associate the packet with metadata that defines protocol-independent policy information, as recited by Applicant's original claim 34. Applicant disagrees with the Examiner's apparent suggestion that the conversion of an ADSL protocol to an internal protocol, such as a DMA protocol, teaches or suggests applications of claim 34, for at least the following reasons.

First, the DMA protocol specifies a process by which data can be retrieve from memory using bus cycles that are unused by the processor. The DMA protocol defines signals and usage of the device's internal data bus by a memory controller in a manner that does not alter or otherwise change the content of the data itself. Similarly, the ADSL protocol and the WAN protocol described by the Deng reference are physical layer protocols that describe how data should be transmitted. Unlike higher-level network protocols, none of these protocols specify the contents of the data contained within the packets. As a result, neither the DMA protocol nor the other communication protocols described by Deng alter any class of service information contained within the data conveyed by the packet. Thus, none of the protocols convert the actual contents of the packet to a different format at all, let alone a different format that is protocol independent.

Consistent with the point above, the "conversion" from the ADSL protocol to the DMA format as described by Deng refers to the physical communication of that data and does not involve the association of metadata with a packet. As the DMA format may involve the segmenting or partitioning of data into set lengths to meet the requirements of the shared bus or memory, the converters of Deng therefore most likely issue the appropriate requests and format the ADSL data or signals in accordance with the DMA protocol such that the data may be stored to the shared memory via the shared bus without involving the CPU. During this process, the converters of Deng do not associate any data, let alone protocol-independent CoS information, with the ADSL data, contrary to Applicant's original claim 34. In fact, the conversion at the physical layer as discussed in Deng occurs without any reference to the actual contents of the packets, and certainly does not access and reference specific CoS information contained within the packet.

Applicant, however, for purposes unrelated to patentability, has amended claim 34 to clarify that a first interface of a network device accesses data within the packet and associates the packet with metadata based on the data within the packet. That is, the first interface understands the actual content of the data within the packet and, based on the data, associates metadata with the packet, which is completely different from the Deng converters that only segment the data for use by the DMA protocol.

Applicant, again for purposes unrelated to patentability, has amended claim 34 to further clarify that the metadata defines protocol-independent class of service (CoS) information and the protocol independent CoS information provides a universal classification mechanism independent of any layer two protocols and protocols of layers on top of layer two used by the network device. In other words, the metadata that is associated with the packet provides CoS information that is "universal" and independent of layer two protocols and protocols above layer two, contrary to the teachings of Deng. In fact, since the data conveyed by the DMA protocol in Deng is not itself modified, any packets containing class of service information would inherently contain that class of service information in the same format as received from the ADSL interface. This would, therefore, be very much in a protocol-specific form that conforms to whatever network protocol was used to convey the data over the ADSL interface. Thus, it cannot be said that the data is associated with metadata that defines protocol-independent class of service (CoS) information, wherein the protocol-independent CoS information provides a universal classification mechanism and is independent of any layer two protocols and protocols of layers on top of layer two used by the network device to forward packets within a network.

Moreover, Deng lacks any teaching concerning CoS information, as recognized by the Examiner on page 11 of the Office Action in presenting the rejection under 35 U.S.C. 103(a). Deng further lacks any teaching of protocol-independent CoS information that provides a universal classification mechanism. The DMA protocol does not provide a classifying mechanism at all, let alone a universal classification mechanism. Rather, the DMA protocol, as described above, defines a process by which peripherals and other devices can access a shared memory without involving a CPU. This data access technique in no way associates the packet with metadata based on data within the packet. Nor does DMA associate metadata with the packet that defines any such protocol-independent universal classification mechanism for CoS

information. DMA merely packages the data to enable transmission over a DMA bus, no inspection of information contained within the data is performed, and no universal classification mechanism is used for CoS information contained within the packet. Deng therefore lacks any teaching of protocol-independent CoS information that provides a universal classification mechanism.

Furthermore, Deng lacks any teaching concerning the use of CoS information that is independent of any protocols, whether layer two or above layer two. As described above, use of DMA to convey packets within a device does not alter the content of the data or otherwise add to, remove from, or update the data, and, as a result, data internal to the packets and contained therein still conform to the upper-level network protocols used over the ADSL or WAN interfaces. Both of these protocols fall within one of the layers of the Open Systems Interconnect (OSI) model, i.e., ADSL is a layer 1 or physical layer protocol and WAN is a layer 2 or data link layer protocol. Thus, Deng lacks any teaching concerning use of CoS information that is independent of layer two protocols and protocols on top of layer two, as recited by Applicant's currently amended independent claim 34.

Notwithstanding the above arguments showing that Deng lacks any teaching at all to suggest protocol-independent CoS information, even if Deng were construed as teaching as much, Deng lacks any teaching to suggest CoS information that is independent of layer two protocols *and* protocols on top of layer two. Deng as described above only teaches to converting a layer 1 protocol, ADSL to the internal DMA protocol, and then from the internal DMA protocol to a layer 2 protocol, WAN protocols. If construed in this manner, Deng therefore would only teach or suggest CoS information that is independent of layer 2 protocols *and protocols below layer two*. This teaching is contrary to Applicant's currently amended claim 34 which clearly requires that the CoS information be independent of layer two protocols *and* protocols on top of layer two.

For purposes of clarity, Applicant directs the Examiner to FIG. 2 which clearly shows conversion of IP CoS information to MPLS CoS information. Paragraph [0038] of Applicant's specification clearly indicates that these two protocols, IP and MPLS, are layered on top of layer 2 protocols, and therefore meet the requirement of protocols on top of layer two, required by Applicant's claim 34. In fact, IP is a layer three protocol within the open systems

interconnection (OSI) model and MPLS resides between layers 2 and 3 and is often considered a layer 2.5 protocol. FIG. 2 further shows application of a policy, e.g., policy 37, to the IP interface, e.g., IP interface 33, to map the IP CoS information to protocol-independent CoS information and application of policy 39 to map the protocol-independent CoS information to MPLS CoS information.

As claims 35-37 dependent from claim 34, these dependent claims also benefit from the arguments made above with respect to claim 34.

Deng fails to disclose each and every limitation set forth in claims 34-37. For at least these reasons, the Examiner has failed to establish a prima facie case for anticipation of Applicant's claims 34-37 under 35 U.S.C. 102(b). Withdrawal of this rejection is requested.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claim 38 under 35 U.S.C. 103(a) as being unpatentable over Deng in view of Kuhl et al. (US 2003/0118026). Applicant has cancelled claim 38 and submits that the rejection of claim 38 is therefore moot.

In the Office Action, the Examiner rejected claims 1-3, 5-10, 12-17, 19-22, and 25-33 under 35 U.S.C. 103(a) as being unpatentable over Deng in view of Applicant admitted art or alternatively in view of Gobbi et al. (US 2002/0044558). The Examiner rejected claims 4 and 18 under 35 U.S.C. 103(a) as being unpatentable over Deng in view of Applicant admitted art or alternatively in view of Gobbi et al., as applied to claims 2 and 16, and further in view of Brothers (US 2002/0083178). The Examiner rejected claims 11, 23, and 33 under 35 U.S.C. 103(a) as being unpatentable over Deng in view of Applicant admitted art or alternatively in view of Gobbi et al., as applied to claims 1, 15, and 29. respectively, and further in view of Chen et al. (US 2003/0053464). The Examiner rejected claim 24 under 35 U.S.C. 103(a) as being unpatentable over Deng in view of Applicant admitted art or alternatively in view of Gobbi et al., as applied to claim 15, and further in view of Hughes (US 6,434,612).

Applicant respectfully traverses the rejections to the extent such rejections may be considered applicable to the claims as amended. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

With reference to independent claims 1, for example, the applied references lack any teaching that would have suggested a method comprising receiving a packet *containing* a first class of service (CoS) information, *wherein the first CoS information specifies a class of service for the packet in a format that conforms to a first network protocol used within a network.*

The applied references further lack any teaching that would have suggested the method of claim 1 further comprising storing intermediate CoS information that provides a universal classification mechanism independent of: (i) any layer two protocols used within the network, (ii) and (ii) protocols of layers on top of layer two protocols used within the network.

The applied references also lack any teaching that would have suggested the method further comprising accessing the first CoS information within the packet to determine the class of service for the packet, and mapping the first CoS information to a second CoS information using the intermediate CoS information, *wherein the second CoS information specifies the class of service for the packet in a format that conforms to a second network protocol used within the network*, and outputting the packet with the network device to forward the packet within the network in accordance with the second network protocol, the packet containing the second CoS information that specifies the class of service information for the packet in accordance the second network protocol.

As described above, Deng describes a device that allows communications to flow between ADSL and WAN protocols, and use of DMA within the device to move data. However, such a low level conversion does not alter or otherwise add to, remove from, or edit the data contained within the packet. Thus, for the same reasons stated above, Deng lacks any teaching concerning CoS information (as recognized by the Examiner on page 11 of the Office Action), policy-independent CoS information, CoS information that provides a universal classification mechanism, and CoS information that is independent of any layer two protocols and protocols on top of layer two. Deng also lacks any teaching concerning accessing data within the packet and associating metadata to the packet based on the data within the packet.

Neither Applicant's admitted art nor Gobbi cure the deficiencies stated above with respect to Deng. The Examiner first states that paragraph [0006] of Applicant's background may be construed as an admission of prior art that reads on the invention set forth in independent claims 1, 15, 26 and 29. Paragraph [0006] is set forth below:

> **[0006]** The various protocols often required different formats and techniques for supporting and communicating the CoS information. Consequently, network devices, such as routers, often employ complex mapping techniques to preserve CoS information when packets are forwarded from one forwarding domain to another, i.e., from one protocol to another. In effect, the network devices utilize the mapping techniques to reformat the CoS information carried by the packets based on the particular protocols being used.

Applicant disagrees that the above paragraph [0006] can be construed to read on mapping from first CoS information to second CoS information using protocol-independent intermediate CoS information, as suggested by the Examiner. Paragraph [0006] instead explicitly states that the mapping techniques reformat the CoS information carried by the packet *based on the particular protocols being used*, which clearly requires a direct, protocol-dependent mapping between protocols, not use of an intermediate, protocol-independent CoS information recited in the claims.

To clarify the significance of such protocol-independent CoS mapping, Applicant directs the Examiner to paragraphs [0018], [0019] and [0046], each of which states example benefits of Applicant's claimed invention. In particular, paragraph [0046] states that protocol-dependent CoS mapping described in paragraph [0006] may require N^2 policies, while protocol-independent CoS mapping may only require 2*N policies, thereby substantially reducing the number of policies that must be defined and maintained.

Likewise, Gobbi fails to cure the deficiencies of Deng stated above for similar reasons to that of Applicant's paragraph [0006]. Gobbi discloses a system for transmitting IP data over an ATM switch architecture in a communications network.[11] The Gobbi system allows for mapping of IP differential services to the ATM quality of service classes but the "[s]upport of IP QoS by the invention is provided naturally because of the choice of ATM."[12] Gobbi however fails to disclose mapping from the first to second CoS information using intermediate protocol-independent CoS information, as required by Applicant's amended claim 1. In fact, Gobbi describes protocol-dependent CoS mapping as discussed by Applicant's paragraph [0006] and

[11] Abstract.
[12] Paragraphs [0017] and [0044].

which suffers from having to define and maintain N^2 policies. Gobbi therefore fails to cure the deficiencies of Deng stated above.

Moreover, Applicant submits that the Examiner has improperly combined either paragraph [0006] of Applicant's specification or Gobbi with Deng to reach the invention set forth in Applicant's independent claims 1, 15, 26 and 29. The Examiner states that "it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method/system/device of Deng by incorporate [sic] the CoS of either the applicant admitted art or Gobbi into Deng's protocol mapping/conversion/translation in order to provide a more robust system 'in application to the case of a geographically-broad coverage, fast packet switch' (Gobbi page 5, left column lines 21-22)."

Applicant disagrees, noting, as above, that Deng's mapping/conversion/translation involves converting from a network protocol to a storage format to another network protocol. The storage format involves no conversion of the content, e.g., CoS information, of the data. Gobbi describes direct mapping, or protocol-dependent mapping, which when applied to Deng, would result in a system for converting CoS information, as it conforms with the ADSL protocol, for example, to CoS information, as it conforms to the WAN protocol. DMA provides no classification mechanism, and certainly no universal classification mechanism, which could act as an intermediary for converting the first CoS information contained within a packet to the second CoS information to be included within the packet. As a result, the combination would result in a direct mapping or protocol-dependent CoS mapping scheme, which, as described above, does not reach the invention set forth by independent claim 1.

As claims 15, 26 and 29 have been amended in substantially the same manner as that of claim 1 and 34, these independent claims 15, 26 and 29 also benefit from the arguments made above with respect to claims 1 and 34.

Each of Kuhl, Brothers, Chen, and Hughes references also fail to cure the deficiencies described above with respect to Deng. Because claims 2-14, 16-26, 27-28 and 30-33 depend from respective independent claims 1, 15, 26 and 29, the arguments made with respect to independent claim 1, 15, 26 and 29 apply equally to each of these dependent claims.

However, Applicant further submits that the dependent claims recite numerous additional features the further distinguish the claimed invention from Deng in view of the Gobbi or Applicant's admitted art.

For example, the Examiner rejected claim 8 by citing the Deng conversion as discussed in column 7, lines 52-57. Claim 8, as amended, requires updating the data included within the packet by adding a header to the data of the packet that specifies the intermediate CoS information. Deng fails to teach or suggest adding a header, and as described above, the DMA protocol does not add a header but merely reformats data so that it can be stored in a shared memory or transferred via a shared bus. Gobbi, for the reasons discussed above, fails to cure this deficiency. Therefore, Deng in view of Gobbi lack any teaching that would have suggested updating the data included within the packet by adding a header to the data of the packet that specifies the intermediate CoS information, as recited by currently amended claim 8.

As another example, the Examiner rejected claim 9 by again referring to column 7, lines 52-57 of Deng. But again, Deng provides no teaching to suggest removing the intermediate CoS information from the data of the packet with the second interface, updating the data of the packet to include the second CoS information, and forwarding the packet with the second CoS information with the second interface, as recited by Applicant's currently amended claim 9. The Examiner apparently infers from Deng's conversion to the DMA format the removing limitation of Applicant's claim 9, as the Examiner provides no direct support to indicate that Deng performs removing of the intermediate CoS information. Applicant submits that converting to the DMA format would not remove any information from a packet, otherwise the information or data of that packet would be lost or corrupted, contrary to the intents of a storage protocol, such as the DMA protocol. Gobbi does not cure this deficiency. Thus, Deng in view of Gobbi lack any teaching or suggestion directed to the removing operation of Applicant's claim 9, as amended.

For at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 1-33 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date: April 24, 2008

By: Kent J. Sieffert

SHUMAKER & SIEFFERT, P.A.
1625 Radio Drive, Suite 300
Woodbury, Minnesota 55125
Telephone: 651.735.1100
Facsimile: 651.735.1102

Name: Kent J. Sieffert
Reg. No.: 41,312